WHAT IS CLAIMED IS:

Sub a1

1. A digital image processing method for enhancing a color digital image composed of a plurality of pixels having color values representative of the image, said method comprising the steps of:

a) identifying a local neighborhood of pixels including a pixel of interest;

b) using the color values of one or more of the pixels from the local neighborhood to calculate a color weighting factor for the pixel of interest, the color weighting factor being a near continuous function of the location of the one or more pixels from the local neighborhood in a color space;

c) applying a spatial filter to the values of pixels from the local neighborhood to calculate a first signal value and a second signal value for the pixel of interest;

d) using the color weighting factor to modify either the first value or the second value;

e) generating an enhanced pixel value for the pixel of interest from the first value and second values; and

f) repeating steps (a) through (e) for other pixels in the color digital image.

2. The method claimed in claim 1, wherein the spatial filter is a function of the pixel values of the local neighborhood.

3. The method claimed in claim 1, wherein the spatial filter is a non-linear function of the pixel values of the local neighborhood.

4. The method claimed in claim 1, wherein the first signal value predominantly relates to the low spatial frequency information and the second signal value predominantly relates to the high spatial frequency information.

5. The method claimed in claim 4, wherein step c) further comprises the steps of applying a spatial filter to the first signal values for pixels in the color digital image to calculate a gradient signal value from the first signal values, and using the gradient signal value to modify either the first signal value or second signal value.

6. The method as claimed in claim 5 wherein the gradient signal values are modified with a single valued function.

7. The method claimed in claim 1, wherein step b) further comprises the steps of identifying one or more color regions in the color space, calculating a pixel color coordinate in the color space for the pixel of interest, and calculating the color weighting factor as a near continuous function of the pixel color coordinate and the one or more color regions.

8. The method claimed in claim 1, further comprising the steps of using the values of pixels sampled from the local neighborhood to calculate a statistical weighting factor for the pixel of interest and using the statistical weighting factor to modify either the first signal value or second signal value.

9. The method claimed in claim 8, further comprising the steps of identifying a noise parameter relating to the expected noise level for the pixel of interest and using the statistical weighting factor and the noise parameter to modify either the first signal value or second signal value.

10. The method claimed in claim 9, wherein the step of identifying a noise parameter comprises the steps of calculating an intensity signal value for the pixel of interest and identifying a noise parameter relating to the expected noise level for the pixel of interest, the noise parameter being a function of the intensity signal value.

11. The method claimed in claim 7, wherein step b) further comprises the steps of calculating a neighborhood color value derived from the values of one or more pixels sampled from a local neighborhood of pixels including the pixel of interest, calculating color distance(s) from the neighborhood color value to the identified color region(s) and using the color distance values to calculate the color weighting factor.

12. The method claimed in claim 11, wherein the neighborhood color value is derived only from the pixel of interest.

13. The method claimed in claim 11, wherein the color weighting factor is calculated as a Gaussian function of the color distance(s).

14. The method claimed in claim 13, wherein the color weighting factor is calculated using a Gaussian function of the color distance values for each identified color region.

15. The method claimed in claim 14, wherein the Gaussian functions are combined in an additive manner to calculate the color weighting factor.

16. The method claimed in claim 14, wherein the Gaussian functions are combined in a multiplicative manner to calculate the color weighting factor.

17. The method claimed in claim 7, wherein the color weighting factor causes an amplification of high spatial frequency information for pixels of interest that are closer in color to one of the identified color regions.

18. The method claimed in claim 7, wherein the color weighting factor causes a reduction of high spatial frequency information for pixels of interest that are closer in color to one of the identified color regions.

19. The method claimed in claim 7, wherein the color weighting factor causes an amplification of high spatial freuqency information for pixels of interest that are closer in color to one of the identified color regions, and causes a reduction of high spatial frequency information for pixels of interest that are closer in color to another of the identified color regions.

20. The method claimed in claim 7, wherein one of the identified color regions is the color of sky.

21. The method claimed in claim 7, wherein one of the identified color regions is the color of grass.

22. The method claimed in claim 7, wherein one of the identified color regions is the color of skin.

23. The method claimed in claim 1, wherein the color digital image has red, green, and blue digital image channels, and further comprising the steps of calculating color difference values as linear combinations of the red, green, and blue digital image channels, and identifying the color regions and calculating the color weighing factors in color difference space.

24. The method claimed in claim 1, further comprising the steps of calculating color difference values as CIELAB a* and b* components, and identifying the color regions and calculating the color weighing factors in color difference space.

25. The method claimed in claim 1, further comprising the steps of calculating color difference values as C* and H* components, and identifying the color regions and calculating the color weighing factors in color difference space.

26. A computer program product for enhancing a color digital image composed of a plurality of pixels having color values representative of the image, said computer program product comprising: a computer erasable storage medium having a computer program store thereon for performing the steps of:

a) identifying a local neighborhood of pixels including a pixel of interest;

b) using the color values of one or more of the pixels from the local neighborhood to calculate a color weighting factor for the pixel of interest, the color weighting factor being a near continuous function of the location of the one or more pixels from the local neighborhood in a color space;

c) applying a spatial filter to the values of pixels from the local neighborhood to calculate a first signal value and a second signal value for the pixel of interest;

d) using the color weighting factor to modify either the first value or the second value; and

e) generating an enhanced pixel value for the pixel of interest from the first value and second values.

27. The computer program product of claim 26, wherein the first signal value predominantly relates to the low spatial frequency information and the second signal value predominantly relates to the high spatial frequency information.

28. The computer program product of claim 26, wherein step b) further comprises the steps of identifying one or more color regions in the color space, calculating a pixel color coordinate in the color space for the pixel of

interest, and calculating the color weighting factor as a near continuous function of the pixel color coordinate and the one or more color regions.

29. The computer program product of claim 28, wherein step b) further comprises the steps of calculating a neighborhood color value derived from the values of one or more pixels sampled from a local neighborhood of pixels including the pixel of interest, calculating color distance value(s) from the neighborhood color value to the identified color region(s) and using the color distance values to calculate the color weighting factor.

30. The computer program product of claim 29, wherein the neighborhood color value is derived only from the pixel of interest.

31. The computer program product of claim 29, wherein the color weighting factor is calculated as a Gaussian function of the color distance values.